WHAT IS CLAIMED IS:

1. A method of manufacturing a diffractive optical element, including a process for forming a resist mask of blazed shape upon a substrate and for etching the substrate by use of the resist mask so that the blazed shape is transferred to the substrate, characterized by a process for forming, before the etching, means effective to prevent a taper shape, to be produced at an edge of the blazed shape of the resist mask, from being transferred to the substrate.

2. A method of manufacturing a diffractive optical element, including a process for forming a resist mask of blazed shape upon a substrate and for etching the substrate by use of the resist mask so that the blazed shape is transferred to the substrate, characterized by a process for forming, before the etching, a mask of non-blazed shape at a position corresponding to an edge of the blazed shape of the resist mask.

3. A method of manufacturing a diffractive optical element, including a process for forming a resist mask of blazed shape upon a substrate and for etching the substrate by use of the resist mask so that the blazed shape is transferred to the substrate, characterized by a process for forming, before the

etching, [a protrusion at a position corresponding to an edge of the blaz d shape of the resist mask.]

4. A method of manufacturing a diffractive optical element [by transferring a mask pattern to a workpiece, characterized in that a shape of a vertical portion of the diffractive optical element is defined by use of a first mask and that a shape of a slant portion of the diffractive optical element is defined by a second mask and in a processing region determined by the first mask.]

5. A method according to Claim 4, wherein the shape of the vertical portion of the diffractive optical element is defined by transferring an edge portion of the first mask.

6. A method according to Claim 5, wherein the processing region is a region determined by transferring the edge portion of the first mask.

7. A method according to any one of Claims 4 - 6, wherein the first mask is made of first and second materials, wherein, after a processing region determined by the first material is processed, the processing region is covered by the second material and, subsequently, the first material is removed and,

while using that portion as a processing region, the processing region determined by the first material is replaced by the second material to cause inversion of processing region.

8. A method according to Claim 7, wherein each of the first and second materials consists of at least one of metal, oxide and nitride.

9. A method according to Claim 8, wherein one of the first and second materials comprises a chromium oxide film, and the other comprises an aluminum film.

10. A method according to Claim 8, wherein one of the first and second materials comprises a dual-layer film having a chromium oxide film and a chromium film, and wherein the other material comprises an aluminum film.

11. A method according to Claim 9 or 10, wherein a silicon nitride is used in place of the materials as aforesaid.

12. A method according to any one of Claims 7 - 11, wherein the inversion of processing region is based on one of etch-back method, lift-off method, damascene method, and selective deposition method.

13. A method according t any one of Claims 4 - 6, wherein the first mask is made of first and second materials, wherein the first material comprises a light blocking material and the second material comprises a negative resist, wherein light is transmitted through the workpiece made of a light transmitting material, from behind thereof, thereby to cause reaction of the negative resist, wherein a processing region determined by the first material is covered by a negative resist and, thereafter, hard baking is carried out, and wherein the first material is removed to cause inversion of processing region.

14. A method according to Claim 13, wherein the first material of the first mask comprises a metal film.

15. A method according to Claim 14, wherein the metal film is one of a chromium film and an aluminum film.

~~16. A method according to any one of Claims 4 - 15, wherein the second mask comprises a resist.~~

17. A method according to Claim 16, wherein the shape of the second mask is defined on the basis of

control of exposure amount.

18. A method according to Claim 17, wherein the shape of the second mask based on the exposure amount control is determined by (i) forming the first mask by use of a material being non-transparent with respect to exposure light and forming the second mask by use of a negative resist, and (ii) tilting incident rays of exposure light when the exposure light is incident from behind the workpiece being made of light transmitting material, where the surface thereof being coated with a resist is a front face.

19. A method according to Claim 18, wherein a structure for preventing reflection is added to the resist surface.

20. A method according to Claim 19, wherein a member having a structure for the reflection prevention comprises a glass plate.

21. A method according to Claim 18, wherein a transparent member of wedge shape is provided at the bottom face of the workpiece, and wherein the exposure light is incident on the workpiece through the wedge shaped member.

22. A method according to Claim 21, wherein the wedge shaped member has an apical angle α determined in accordance with a relation $\alpha = 90$ deg. $- \theta$ where θ is a blaze angle.

23. A method according to Claim 4, wherein the shape of the vertical portion of the diffractive optical element is defined by use of the first mask having wall-like protrusions formed with a desired period, and wherein the shape of the slant portion of the diffractive optical element is defined by use of the second mask which comprises a resist pattern of desired shape, being provided between the protrusions of the first mask.

24. A method according to Claim 23, wherein the protrusions of the first mask are defined by the provision of wall-like protrusions of desired period formed by etching the workpiece to a desired depth.

25. A method according to Claim 23 or 24, wherein the resist pattern, the protrusions and the workpiece are etched simultaneously by which the shape based on the resist pattern and the protrusions is transferred such that a blazed shape of right triangle is defined on the workpiece.

26. A method according to Claim 4, wherein the shap of the vertical portion of the diffractive optical element is defined by use of the first ma k provided by embedding an etching mask in a wall-like groove having a desired period, and wherein the shape of the slant portion of the diffractive optical element is defined by use of the second mask comprising a resist pattern of a desired shape being provided between the etching masks.

27. A method according to Claim 26, wherein a protrusion of the first mask is formed by etching the workpiece to a desired depth to produce the wall-like groove of desired period and thereafter by embedding the etching mask in the groove.

28. A method according to Claim 27, wherein the resist pattern and the workpiece are etched simultaneously to produce a slant portion of the blazed shape, having a right angle shape, and wherein the etching mask is subsequently removed whereby a shape based on the resist pattern and the etching mask is transferred, such that a blazed shape of right angle shape is formed on the workpiece.

29. A method according to any one of Claims 23, 24, 26 and 27, wherein the wall-like protrusion or the

etching mask has a width not greater than 150 nm.

30. A method according to Claim 28, wherein a reflection film comprising a chromium film, an aluminum film and a quartz film is formed on the substrate having a triangular blazed shape.

31. A mold for production of a diffractive optical element, characterized in that the mold is manufactured in accordance with a method as recited in any one of Claims 1 - 30.

32. A diffractive optical element characterized in that the diffractive optical element is manufactured in accordance with a method as recited in any one of Claims 1 - 30.

33. An optical system characterized by including a diffractive optical element as recited in Claim 32.

34. An optical instrument characterized by including an optical system as recited in Claim 33.

35. An exposure apparatus characterized by including an optical system as recited in Claim 33.

36. A device manufacturing method characterized by producing a device by use of an exposure apparatus as recited in Claim 35.

37. A device characterized by being produced in accordance with a device manufacturing method as recited in Claim 36.